TABLE 2.—*Vapor pressures at pyrheliometric stations on days when solar radiation intensities were measured.*

Washington, D.C.			Madison, Wis.			Lincoln, Nebr.			Santa Fe, N. Mex.		
Date.	8 a.m.	8 p.m.	Date.	8 a.m.	8 p.m.	Date.	8 a.m.	8 p.m.	Date.	8 a.m.	8 p.m.
1919.	*mm.*	*mm.*	1919.	*mm.*	*mm.*	1919.	*mm.*	*mm.*	1919.	*mm.*	*mm.*
Sept. 3	8.81	12.68	Sept. 1	9.83	6.76	Sept. 1	8.48	8.81	Sept. 5	7.57	5.56
4	10.21	14.60	4	10.21	8.81	5	10.59	9.83	10	9.14	7.57
8	16.79	16.79	8	14.60	15.11	6	12.24	11.81	11	9.14	10.59
12	8.48	7.29	11	10.97	7.87	9	16.20	17.37	17	9.47	7.29
13	8.48	10.21	12	7.87	7.57	11	12.68	8.48	18	8.81	8.48
16	13.13	10.21	15	10.97	10.97	23	6.50	8.48	25	5.36	4.95
18	7.87	8.81	16	9.47	9.14	25	6.76	6.76	27	8.48	7.29
24	9.83	11.38	20	14.10	16.79	26	9.14	10.21	28	7.29	5.79
25	9.83	10.21	22	7.87	7.29						
26	7.87	7.87	23	7.04	7.57						
27	7.04	9.47	24	7.29	7.29						
			26	5.36	6.50						
			27	7.87	10.59						

TABLE 3.—*Daily totals and departures of solar and sky radiation during Sept., 1919.*

(Gram-calories per square centimeter of horizontal surface.)

Day of month.	Daily totals.			Departures from normal.			Excess or deficiency since first of month.		
	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.	Washington.	Madison.	Lincoln.
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
1	413	532	587	10	134	137	10	134	137
2	322	284	314	− 80	−111	−133	− 70	23	4
3	493	134	377	93	−257	− 68	23	−234	− 64
4	413	486	502	15	98	59	38	−136	− 5
5	399	458	558	3	73	117	41	− 63	112
6	462	480	530	68	99	92	109	36	204
7	419	446	562	27	70	128	136	106	332
8	414	430	553	24	58	122	160	164	454
9	269	189	496	−120	−198	68	40	− 34	522
10	70	251	310	−317	−112	−114	−277	−146	408
11	340	523	553	− 45	165	132	−322	19	540
12	478	499	519	95	145	101	−227	164	641
13	505	417	291	123	67	−122	−104	231	519
14	454	192	486	74	−153	75	− 30	78	594
15	340	466	376	− 38	125	− 32	− 68	203	562
16	404	492	270	28	155	−135	− 40	358	427
17	373	198	152	0	−136	−251	− 40	222	176
18	450	92	48	79	−238	−352	39	− 16	−176
19	212	235	403	−156	− 92	5	−117	−108	−171
20	331	253	501	− 35	− 70	105	−152	−178	− 66
Decade departure							125	− 32	−474
21	343	70	202	− 20	−250	−191	−172	−428	−257
22	120	466	521	−241	150	130	−413	−278	−127
23	37	466	524	−321	153	135	−734	−125	8
24	457	462	504	101	153	118	−633	28	126
25	454	466	526	101	160	142	−532	188	268
26	455	346	540	105	43	159	−427	231	427
27	414	430	103	68	130	−274	−359	361	153
28	393	81	171	50	−215	−203	−309	146	− 50
29	332	94	75	− 7	−199	−295	−316	− 53	−345
30	350	52	126	14	−238	−241	−302	−291	−586
31									
Decade departure							−150	−113	−520
Excess or deficiency since first of year. gr.-cal.							−4999	−3657	−2534
Excess or deficiency since first of year. per cent.							−4.8	−3.5	−2.1

MEASUREMENTS OF THE SOLAR CONSTANT OF RADIATION AT CALAMA, CHILE.

By C. G. ABBOT.

[Dated: Astrophysical Observatory, Smithsonian Institution, Washington, Oct. 13, 1919.]

In continuation of preceding publications I give in the following table the results obtained at Calama, Chile, in August, 1919, for the solar constant of radiation. The reader is referred to this REVIEW for February, 1919, and July, 1919, for statements of the arrangements and meaning of the table.

During the present month the observations have been made very largely by the new method which was described in the REVIEW for the last-mentioned date, but part of them are also by the old method on which the new is fundamentally based. The reader will see that generally the agreement between the different determinations,

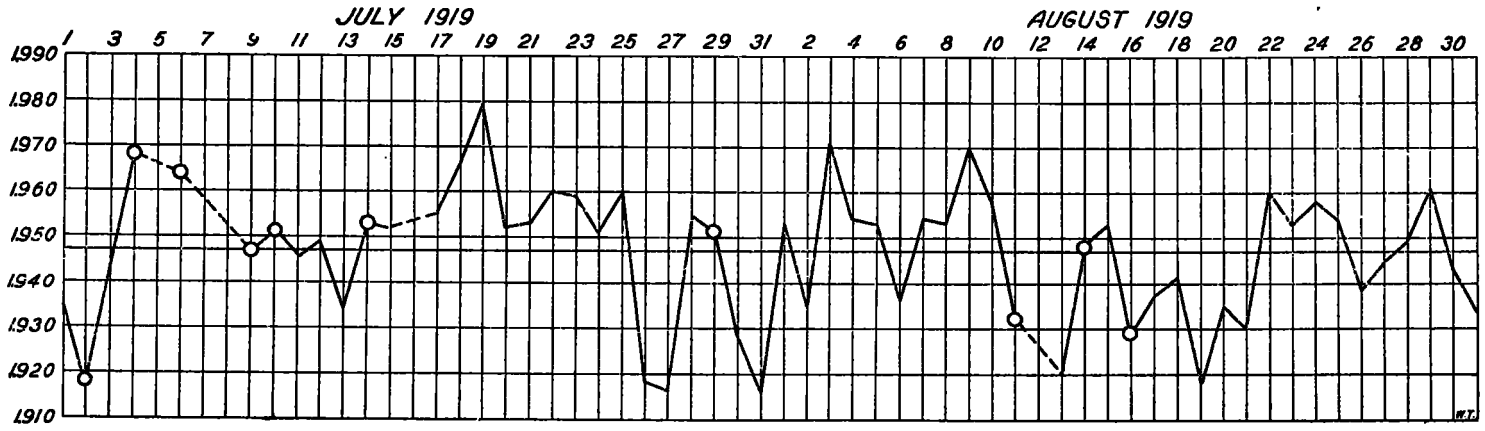

FIG. 1.—Solar constant values obtained at Calama, Chile. (Where circles are shown, but one set of observations is represented.)

whether by the old method, or by the new at air mass 2, air mass 3, or some other odd air mass, are in close agreement. Generally two, and sometimes three or four independent determinations are given for each day. Their usually close agreement seems to me to warrant much higher faith than formerly in the accuracy of the representative values for the individual dates.

In further support of the trustworthiness of the new method I give the following brief table taken from results which Messrs. Moore and Abbot have recently computed covering 53 days in which observations were made by both the old and the new methods.

Number of departures of specified magnitudes in calories.

	0–0.005	0.005–0.010	0.010–0.020	0.020–0.030	0.030–0.040	0.040–∞
No. (+)....	7	4	8	4	5	4
No. (−)....	5	2	6	4	2	3

From this table it appears that on 32 out of 53 days the deviations between the results by the two methods were less than 1 per cent, and that in 46 out of 53 days the deviations were less than 2 per cent. From notes which accompany the actual observations it is apparent that on most of the days when large deviations occur between the old and the new methods, the cause of these large deviations arose from the fact that the sky was either clearing or growing more hazy, so that the result by the old method was in error in the sense in which the deviations actually occurred. Thus, we may confidently believe, I think, that the results by the new method are trustworthy, and more particularly so where they are supported by observations at air mass 3 as well as at air mass 2. Not only so, but they are more trustworthy than results by the old method because the changes of the transparency of the atmosphere are eliminated. Although the present month of August was not particularly favorable, owing to a larger number of clouds than usual, yet the observers were able to secure good results on 30 days out of 31 owing to the availability of the new method.

As further evidence of the trustworthiness of the results obtained, the reader is invited to plot the weighted mean values as ordinates against the successive days as abscissae and note the comparative smoothness and step-by-step march of the curve from maximum to minimum and return.

Date.	Solar constant.	Method	Grade.	Transmission coefficient at 0.5 micron.	Humidity. ρ/ρsc.	Humidity. V. P.	Humidity. Rel. hum.	Remarks.
1919.								
A. M.	*Cal.*					*Cm.*	%	
Aug. 1	1.951	E_0	E	0.872	0.618	0.09	13	
	1.952	M_3						
	1.956	M_2						
	1.953	W. M.						
2	1.928	M_3	S	.872	.506	.17	17	Cumuli low in east.
	1.938	M_2						
	1.935	W. M.						
3	1.980	M_3	S	.861	.425	.03	27	Cumuli low in east.
	1.966	M_3						
	1.971	W. M.						
4	1.954	M_3	S	0.867	0.502	0.23	23	
	1.949	M_2						
	1.954	W. M.						
5	1.936	E_0	VG−	.862	.522	.16	21	Some small cumuli in east and north, but disappearing.
	1.978	M_3						
	1.957	M_2						
	1.953	W. M.						
6	1.934	M_3	S	.857	.503	.11	13	Many thin cirro-cumuli in south.
	1.937	M_2						
	1.936	W. M.						
7	1.943	M_3	S	.867	.583	.13	17	
	1.959	M_2						
	1.951	W. M.						
8	1.967	F_0	E−	.860	.654	.13	22	
	1.949	M_3						
	1.949	M_2						
	1.953	W. M.						
9	1.981	M_3	S	.867	.601	.18	25	
	1.971	$M_{2.3}$						
	1.965	M_2						
	1.970	W. M.						
10	1.957	M_3	S+	.870	.590	.14	22	Some cirri in northeast.
	1.959	M_2						
	1.958	W. M.						
11	1.932	M_2	S	.807	.712	.10	9	Scattered cirri over much of sky.
13	1.937	E_0	G+	.836	.575	.11	17	
	1.911	M_2						
	1.920	W. M.						
14	1.948	M_2	U+	.850	.574	.31	27	Cirri in south and east and scattered cumuli in north.
15	1.984	M_3	S−	.868	.595	.15	16	Few cumuli in north.
	1.930	M_2						
	1.953	W. M.						
P. M.								
16	1.929	M_2	U+	.854	.689	.16	10	Scattered cumuli in north and east in a. m. Cumuli in distant east and west in p. m.
A. M.								
17	1.910	M_3	S	.855	.521	.21	18	Scattered cirri about sky, but none near sun.
	1.950	M_2						
	1.917	W. M.						
18	1.988	E_0	VG+	.861	.691	.08	12	Distant cirri in northeast and southwest.
	1.910	M_3						
	1.917	M_2						
	1.951	W. M.						
19	1.919	M_2	S	.862	.592	.11	11	Scattered cirri about sky.
	1.916	$M_{2.67}$						
	1.918	W. M.						
20	1.932	M_3	S	.867	.507	.19	19	Distant cirri in west.
	1.936	M_2						
	1.935	W. M.						
21	1.944	M_3	S−	.866	.480	.15	16	
	1.916	M_2						
	1.930	W. M.						
22	1.959	E_0	E	.862	.493	.18	19	
	1.972	M_3						
	1.956	M_2						
	1.960	W. M.						
23	1.972	M_3	S	.869	.592	.19	19	
	1.953	M_2						
	1.953	W. M.						
24	1.932	M_3	S−	.859	.618	.12	12	
	1.967	M_2						
	1.958	W. M.						
25	1.941	M_3	S−	.866	.638	.14	15	
	1.958	M_2						
	1.951	W. M.						
26	1.937	E_0	VG+	.861	.596	.15	22	
	1.923	M_3						
	1.917	M_2						
	1.938	W. M.						
27	1.938	M_3	S	.871	.626	.10	13	
	1.949	M_2						
	1.945	W. M.						
28	1.947	M_3	S	.873	.666	.10	14	
	1.950	M_3						
	1.949	W. M.						
29	1.961	E_0	VG+	.865	.690	.20	12	
	1.960	M_3						
	1.958	M_2						
	1.961	W. M.						
30	1.935	M_3	S−	.872	.724	.07	8	
	1.947	M_3						
	1.943	W. M.						
31	1.922	M_3	S−	.872	.723	.06	9	
	1.940	M_2						
	1.934	W. M.						